the metalchrome story

By Grey L. Silva

The name "Metalchrome" implies the conversion of the silver image in a photograph to metallic salts—plus the addition of color.

In essence, toners and water soluble analine dyes are used selectively and in combination to color the image within the emulsion of the print. The colors are transparent—there is no overlay of opaque pigment on the surface, as with photo-oils.

In practice, a black-and-white print is sepia-toned. Gold chloride solution is then applied selectively to the flesh-tone and other warm-tone areas to produce red tones. The chemical tones thus produced are then modified with the dyes to produce the very real and beautiful flesh tones characteristic of this process. Dyes are then used over the rest of the print to suit the mood and key of the picture according to the wishes of the maker.

THE CAPSULIZED description above, in essentially the same form, was written as a foreword to the color section of a reprint of *Monsters and Madonnas,* a collection of pictures made by the late William Mortensen, FPSA. It is the only information on the Metalchrome process published up to this time.

This toner and dye process of turning a black-and-white print into a color print was developed by Mr. Mortensen and was refined over many years. From the twenties to the late thirties he experimented with all manner of toners, pigments and dyes, trying to find a combination which would produce a valid result under complete control of the maker. Prior to his death in 1965, the process was known only by those of his students who had contracted to take this particular instruction. Understandably, since teaching was an important part of Mortensen's professional career, each student was asked to agree not to divulge details of the instruction.

Since his passing his widow, Mrs. Myrdith Mortensen, has come to believe with the author that the process in detail should be on permanent record for at least two reasons: to put the information in the hands of the print-makers who might best appreciate and use it, and to commemorate the life and work of William Mortensen, one of the "great ones" of this century. We of the Photographic Society of America are deeply grateful to Mrs. Mortensen for her permission and cooperation in preparing this article for the membership.

William Mortensen was born in

about the author

Grey Silva makes his home at San Diego, Calif. He first became interested in photography in 1957 and went to William Mortensen for instruction. He drove to Laguna Beach at least one day per week from then on, staying for a week or two at a stretch several times each year, until Mr. Mortensen's death in 1965. "In the course of our association we shared many enthusiasms," he reports, ". . . photography, painting and the arts in general, and enjoyed a close friendship based on these enthusiasms. At the end of the nine years I was still learning much from this great maker of pictures—and was beginning to understand that which he had been teaching through the years. I enjoy life immensely. A large part of this is the enjoyment of making prints and the appreciation of the works of others, in any media. This I attribute directly to the motivation, instruction and inspiration he gave me."

Mr. Silva will present a program on the Metalchrome process at the PSA International Convention in Los Angeles next August, showing results in color and demonstrating some of the more difficult parts of the technique. His portrait above was made by Mr. Mortensen.—Ed.

ORIGINAL METALCHROME TEXT
MORTENSEN SCHOOL OF PHOTOGRAPHY
Laguna Beach, California

Instructions for Metalchrome Process

The information contained in this book, and in the course of which it is a part, is accepted by the student on the pledge that he will keep it solely for his own reference, and under no condition loan, sell, or reveal any details of the process to any person or persons whomsoever.

Outline of Metalchrome Process

Subject Matter to Select:
Simple broad masses with one primary or dominant color, this place coincident to the greatest subject interest.
Subject Matter to avoid:
1. Intricate patterns involving numerous small areas of various colors.
2. Contrast of lighting.
3. Contrast of local tones.
Lighting:
Basic or modified basic or plastic.
Printing Paper:
Gavaert Projection Proof 2N.
Exposure, Print:
For light-area.
Develop:
Fully; for at least 4 minutes in Pictone 4 to 1.
Fix:
In usual manner in normal acid hypo.
Wash:
Thoroughly to remove every trace of hypo. If prints are dry, soak before beginning color. Wipe as dry as possible on both sides with towel.
Immerse Print in Ferricyanide Bleach:
When bleaching is completed (bleached areas turn lemon yellow), wash thoroughly. Then place in Sulphide solution for one minute.
Wash Thoroughly:
Blue and Gray Eyes:
Apply a wad of chewing gum to this area before the Ferricyanide Bleach.
For Red, Orange, Warm Brown, and Flesh Tones, Continue As Follows:
Apply Gold Chloride Toner With Brush.
Apply first to lips and other portions where deep red tones are desired. When distinct redness appears in lips, apply toner to cheeks and spread it from there over the rest of face. When toning has progressed far enough, **blot** off excess toner. Wash thoroughly.
Your Chemical Red Tones Are Now Complete.
Secondary Color Agents:
You are now ready for the application of the secondary color agents.
1. The background at this time, is a tan color. Over this background a "flow" of either dilute three-color blue or yellow is applied. This establishes a "key" of color harmony to which the flesh or other portions of the main image must conform.
2. Remember that every color must possess some of the tint of the color bordering it. This is imperative if harmony is to be obtained.
3. The flesh of a portrait must have a wash of dilute three-color blue over all the area except the lips.
4. Other portions of the print are then colored with application of the color desired, or any combination of the three primary dyes. Experience will show that any color in the pigment world can be obtained by the admixture of the three primaries.
5. After the main areas of the color have been applied (usually with the large brush) the remaining application of the dye is done with a small No. 4 sable brush and with great care and patience small areas of too hot color are cooled down while small areas of too cold color are toned into warmer shade.

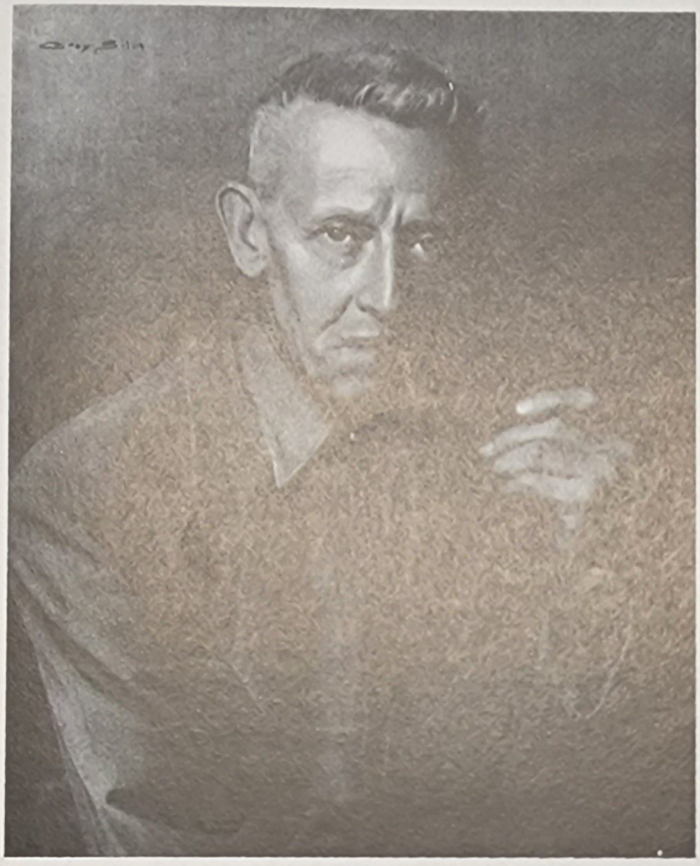
Notes On Treatment of Flesh Tones.
1. When gold chloride toning is complete, flesh should look quite ruddy.
2. Flesh tones are reddest on convexities, i.e., cheeks, chin, tip of nose, knuckles of hands, etc.
3. Spread a general wash of dilute tri-color blue over all flesh areas.
4. Mix two washes in the porcelain palette, one dilute orange, the other blue violet. Use these to balance flesh tones. Use orange to warm up areas that are too cold; use blue-violet to cool down areas that are too hot.
The print is now thoroughly dried and placed in a press.

Materials For Metalchrome Process

Primary Color Agents.
1. Ferricyamide Bleach (use without dilution).
2. Metallic base (sulphide toner—for use, dilute with twenty parts of water).
3. Gold chloride toner (do not dilute).
Secondary Color Agents.
1. Tri-color blue (Cobalt Blue).
2. Tri-color yellow (Lemon Yellow).
3. Tri-color red (Crimson Lake).
4. Tri-color blue and red.
5. Tri-color yellow with red.
Accessories:
1. Two pots.
2. One brush container.
3. Four brushes.
4. Three droppers.
5. Three Mongol crayons, Nos. 845, 846, and 867.
6. One package pumice.
7. Porcelain palette.
8. One dozen blotters.
9. Razor blades.
Formulae
1. **Ferricyanide Bleach**
Potas. Ferr ..... 1 oz.
Potas. Bromide ..... 1 oz.
Dist. Water to .....20 oz.
2. **Stock Sodium Sulphide**
Pure Sodium sulphide ..... 2 oz.
Water ..... 5 oz.
3. **Gold Chloride Tone**
a. Dissolve 15 grs. gold chloride in 8½ oz. of water.
b. Hypo .....310 grs.
Thiocarbamid ..... 155 grs.
Water ..... 8½ oz.
Pour solution a. into b. solution.
Keep in brown bottle.
Tri-color red, blue and yellow are listed as: Crimson Lake, Cobalt Blue, and Lemon Yellow, and are obtained from: The Wold Air Brush Co., Chicago, Ill.

Basic Rules in Color

1. There should not be more than one area of pure (or nearly pure) color.
2. This area should not occupy more than one-eighth of the entire picture space.
3. This area of dominant color should be near the point of greatest interest in the subject.
4. Colors in all other parts of the picture must be subdued or secondary.
5. All these secondary colors must contain at least a faint tincture of the color of the dominant area.
6. Each area of secondary color must contain a trace of the color of the immediate adjacent areas.
7. In the shadows or depressions of the secondary washes of color there should be stronger color of the same hue.



William Mortensen, FPSA in a portrait reproduced from a Metalchrome original by Grey Silva.

Park City, Utah, high in the Sawtooth Range which overlooks Salt Lake City, in 1897. He was much interested in art through his school years—studying at that time under J. T. Harwood of Salt Lake City. At the end of World War I, ex-private Mortensen signed up with Art Students' League in New York. There he studied under such teachers as George Bridgman, George Bellows, and Robert Henri. He then went to Greece to paint, etch, and as he put it "to starve rather ungracefully." Leaving Greece broke and somewhat disillusioned, he returned to Salt Lake City to teach art in his old high school.

This he did until the lure of Hollywood attracted him in the early twenties. He worked with Ferdinand Pinney Earle as set designer for "The Rubaiyyat of Omar Khayyam," and learned photography under Arthur Kales, a prominent still photographer of that time. Kales was much impressed with young Mortensen, who progressed so rapidly it wasn't too long before he was head still man for Cecil B. DeMille in such pictures as "King Kong" and "King of Kings." In the latter picture he abandoned the usual procedure of taking posed movie stills with an 8 x 10 camera. By using a much smaller camera and shooting during the actual filming of the scenes he achieved amazing results. A portfolio of his pictures from "King of Kings" is in the Vatican Library.

He eventually settled in Laguna Beach, Calif., an art colony of that day, for a life somewhat less hectic than that of Hollywood. There, in the early thirties, he found the time and the curiosity to delve into control processes. The reason behind this preoccupation was his deep conviction, born of his art training, that there should be a means of controlling unwanted detail in any picture. This opinion, of course, is shared by some and rejected by others in photographic circles. He worked on various means of controlling or eliminating detail on the negative and on the print. After years of experimenting in this direction he decided that for his purposes the technique of working directly on the print with a blade was much the best. This he called abrasion, or abrasion-tone. He both used and taught this particular control means through the rest of his career.

For similar reasons he developed the Metalchrome process as a means of giving the maker complete control of the print from the standpoint of color.

There has been much talk in photographic circles over the years of the "secrecy" of the Metalchrome process. For this reason, it seemed the best way of presenting this material would be to print the accompanying "Original Metalchrome Text," word for word, as it was presented to Mortensen's Metalchrome students over his teaching career.

While this text might be sufficient when accompanied by demonstrations and instruction, I feel that a more detailed explanation of some of the important points may be helpful to the uninitiated. Accordingly they will be discussed under various headings in the notes that follow.

Printing Paper:

This refers to an old Gevaert 2N formula which has been changed radically. Almost any paper may be used however, as paper preference was governed by its adaptability to the "abrasion" or etching method of print control.

Develop:

Fully, in developer of your choice.

Wash:

After the print is washed, I generally prefer to remove only the sur-

Vintage (above) and Eiler Larsen (facing page), both by Grey Silva, show how period portraits and character studies lend themselves to print making by the Metalchrome process.

face water from the face of the print in order to keep the print from drying too soon.

Blue and Gray Eyes:

While the "wad of chewing gum" works just fine—rubber cement or frisket of any kind may be used with equal success, in case one does not chew gum. The aim is to "stop off" an area by protecting it from the action of the solution.

Gold Chloride Toner:

This particular use of Gold Chloride is apparently not too well known, and can cause a bit of trouble for the beginner. The following expanded explanation may be useful.

In practice the Gold Chloride Toner is used as a red toner—applied to the sepia-toned print in a selective manner to produce a range of red tones. The selective toning can be done by masking in the usual manner. In this instance, however, it has been found more satisfactory to use the "wet-print" method. This means soaking the print, blotting off the surface water from the face of the print, then applying the Gold Chloride to the desired areas with a brush. In this manner any degree of redness can easily be achieved. In the case of flesh-tones the usual procedure is to outline the flesh area with a brush wet with the solution—then flood the area inside the outline. This turns the flesh area red proportionally. The blotted print tends to keep the enclosed puddle of solution within the confines of the outline. If moderate care is taken there will be little or no leakage over the line. If the solution does get into any unwanted areas, it is a simple matter to immerse the print in water, blot, and begin again.

Secondary Color Agents:

Any of the at least six or eight brands of water-soluble analine dyes may be used. See your local graphic arts supply house. They may be "retouch" dyes or air-brush dyes—in any case the preference would be up to the user. The choice of the basic red-blue-yellow would also be that of the user, as would be the choice of intermediates such as red-blue, yellow-red, or any other. These selections should be made by each maker to best reflect the color-taste and discrimination of that maker. Transparent air brush colors are available by mail order from World Air Brush Mfg. Co., 2173 N. California Ave., Chicago, Ill. 60647, and a free catalog can be obtained from the manufacturer.

The dyes are best applied with brushes, the sizes of which vary with the individual, (I prefer round pointed sables from no. 5 to no. 15). The print is prepared for the dye application by soaking and blotting as in the gold tone application.

The distinctive flesh-tones are achieved by modifying the warm red of the gold tone with the dyes. For most, this part of the technique is the most difficult to acquire. The key to successful application is that it *must* be applied in the exact density of the underlying image to neutralize the warm tone of the red with the cool blue or green of the dyes. This key fact has been lost to many who have tried the process, and if lost can only result in an undesirable grubby or "tinted" appearance.

On Abrasion

The abrasion method of print control and finishing is described at length in Mortensen's book, *Print Finishing*. Abrasion in this instance

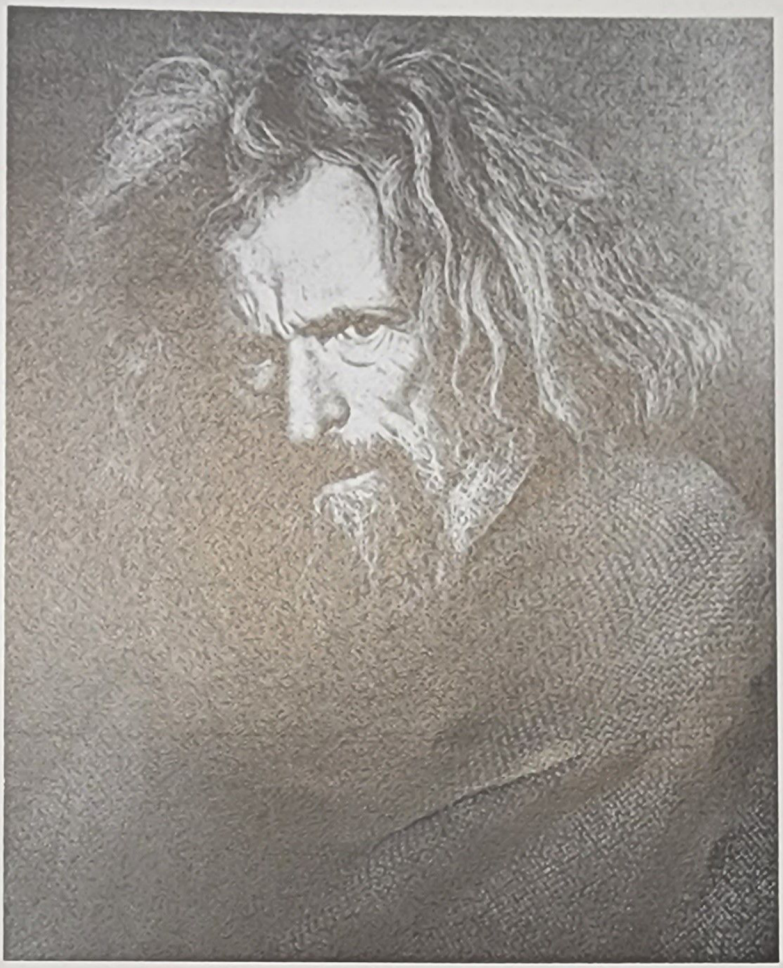
means, simply, breaking a single-edge razor blade diagonally to form a tapered cutting point which is used as an etching tool on the face of a dry print. This is done to control contrast in small areas, to remove small areas of unwanted detail, or to improve or emphasize any part of the picture by lightening tones.

As a print control method it compares in results with the paper negative technique, or local print reduction with Etchadyne. It might be noted here that of the three men who are currently exhibiting Metalchrome prints in the salons, Richard Maybery of Laguna Niguel, Calif., uses abrasion but sparingly. Noel Engel of Houston, Tex., prefers to use Etchadyne or paper negative, and I use all three but mostly abrasion or paper negative. Whether or not any of the black-and-white print control methods are used has little effect on the application of color.

The "tone" mentioned in the book consisted of powdered drawing crayons blended to match the black-and-white emulsion. This powder was smudged into the emulsion and controled by blending with powdered pumice. Subsequently the crayon powders were replaced with regular drawing pencils, and the pumice procedure was dropped in 1948 or thereabouts. The crayons mentioned in this text were Mongol pencils—red, blue and black—and were used for the final spotting of the completed Metalchrome print. The Mongols have since been replaced by "Winner" pencils. This spotting and finishing operation may also be done with the dyes on the completed print.

All the Mortensen books have been out of print for some time now. The list of titles follows:

The Model
Pictorial Lighting
Outdoor Portraiture
The Command to Look
Monsters and Madonnas
New Projection Control
Flash in Modern Photography
Print Finishing
Posing the Model



This month's Cover

Pouring Milk, which appears on the cover of this month's Journal, is an outstanding example of Mortensen's work with Metalchrome. Each year the Royal Photographic Society's Council elects a recipient of the Hood Medal, presented for "A meritorious performance in some field of photography." In 1949 the Royal awarded this medal to Mortensen in recognition of his efforts in developing the process, and to *Pouring Milk* as an example of the Metalchrome technique.

The Metalchrome process of applying color to a black-and-white print—while it certainly gives the maker complete control of the color—does not tell the maker how to use the color under his control. This brings up a rather pertinent question; why are we using color on the print in the first place? Having color just for color's sake is not enough. To make a successful color rendition it is necessary to know something of the use of color. In a word, color for color's sake is rather unimportant. Color for the sake of imparting the emotion and mood of the picture story has a potential beyond conjecture, in photography as in any other medium.

In any case, this enchanting means of making a picture can't help but give the user an intense feeling of satisfaction with every completed print. It also must help one to grow pictorially with each success—and with each failure. One develops a real appreciation of the works of those who have mastered the use of color in any medium—photography, oils, water color, or whatever. A picture is a picture. However you make yours—enjoy it! ■